low barometric pressure. Various fruit and shade trees are susceptible to frost-cracks and the principal injury caused is to induce a tendency to bleeding.

SUN-SCALD.

What is called "sun-scald" is associated with severe and abrupt changes in temperature on non-ripened wood. Sun-scald may occur either in the winter or in summer. When coniferous forests are thinned and sunshine is allowed to enter, the exposed trees are likely to suffer from sun-scald. The moose maple, a shade-loving tree, will sun-scald badly in such a thinned forest or whenever transplanted to the open.

Among shade trees the rock maple is one of the most subject to sun-scald; also among fruit trees and shrubs various kinds are affected. Sun-scald is more likely to occur on unpruned apple trees than on pruned ones, or on shaded limbs than on those growing under good light conditions. The shaded limbs on unpruned and neglected apple trees are more likely to be affected by sun-scald owing to the development of unripened wood. Sun-scald may also follow as a result of too intensive sunlight, as, for example, when certain fruit trees are stripped of their foliage in the summer, such as sometimes results from the ravages of the gypsy moth. In such instances the new unripened wood sun-scalds badly.

SUN-SCORCH.

"Sun-scorch," a term applied to the burning of foliage, generally occurs in Summer during periods when the soil is dry, and also is common to evergreens during warm windy days in Spring before the frost is out of the ground. Any defects in the root system which prevent root absorption are likely to give rise to sun-scorch. In the case of evergreens sun-scorch is not infrequently ascribed to winter injury and in fact it may follow winter killing of roots. It may be induced by any cause responsible for a defective root system, such as by winter killing of roots, by drought, or by the use of such fertilizers as have an inhibitory effect on root absorption, etc.

Sun-scorch is common to many trees, particularly the rock maple, and is characterized by a burning of the foliage, which often becomes lacerated when strong winds prevail. Since sun-scorch occurs on the side of the tree coinciding with the direction of the prevailing winds, the particular combinations of meteorological conditions which cause this can readily be determined. In one instance when the wind was blowing at the rate of 72 miles an hour from the northwest during May, at a time when the soil was relatively dry and the leaves exceptionally tender, practically all of the foliage of the rock maples over a large section was sun-scorched on the northwest side of the trees. During another severe dry period in Summer, when the wind was blowing at 80 miles an hour, the white pines in southern New England, which were suffering from a defective root system were sun-scorched.

BRONZING.

"Bronzing" of foliage is a form of sun-scorch characterized by the occurrence of a reddish-brown or bronze color of the leaf. It is produced by lack of soil moisture or defective root absorption during dry, hot periods. In bronzing, the cells farthest removed from the water-conducting tissues of the veins and veinlets of the leaves collapse from want of water, while those nearest to the water-conducting channels may remain alive. These groups of dead cells give the leaf the peculiar color from which this type of sun-scald takes its name. The location of some trees is such that they are subjected to sun-scorch or bronzing during every dry period.

The burning which has occurred so extensively to conifers and evergreens, particularly rhododendrons, during the past Spring comes under the catagory of sun-scorch. This has occurred frequently through many portions of New England. It has been, however, more severe around New York than farther north and has there affected a large variety of evergreen plants.

We are of the opinion that this burning can be traced to the unusually warm period which occurred between January 21 and 29, 1916, at which time the maximum temperature was 60° F. on the 22d and 70° F. on the 27th. This warm spell was responsible for greatly accelerating the vital processes in plants, and the low temperatures which immediately followed it undoubtedly caused the injury. In some instances the leaves were merely scorched and the terminal buds and wood untouched, while in others the burning was more severe and the wood was injured to such an extent that it died back as the warm weather approached.

This burning appears to have been associated with excessive transpiration or exhalation of water from the leaves at a time when the ground was frozen and the water supply to the roots was insufficient, hence causing a wilting and dying of the foliage and, in instances, of much of the younger wood. Some of the hardier rhododendrons appear to have been burned more than those regarded as tender, and plants under trees seem in many cases to have burned more than those exposed to the direct sun. Generally when spring-burning occurs to evergreens it is associated with more or less strong winds and one side shows the burning more than the other. The injury to foliage and wood occurring to plants during the winter does not always show itself immediately, but is bound to be discernible during March or April when the sunshine is more intense and warm strong winds are likely to occur. It is rather difficult to prevent burning to outdoor plants when unusual and extremely abnormal periods occur in mid-winter. Ordinarily most burning occurring to evergreens during the Spring at a time when the frost is in the ground and warm winds prevail, can be prevented if care is taken to handle the plants properly. Where beds are mulched heavily with leaves it is a good idea to remove this mulching from around the base of the plants as soon as there is a tendency for the frost to disappear. This allows sunlight and heat to enter and thaw out the soil around the plants, which in turn gives an opportunity for the roots to absorb water. After the frost is out of the ground the mulching can be replaced.

The removal of the frost and warming of the soil around the roots of plants by any method which will meet the demands of transpiration, or loss of water from the foliage, will prevent sun-scorching of the young wood and foliage.

LASSEN PEAK'S NAME.

U. S. GEOLOGICAL SURVEY PRESS BULLETIN.

[Released October 30, 1916.]

The press dispatches describing the latest eruptions of Lassen Peak show a continued tendency to refer to the volcano as Mount Lassen. *Lassen Peak*, as the most active and interesting volcano in the United States, is specially entitled to be called by its own name, and

acts of Congress and Presidential proclamations in creating and recognizing the Lassen Peak National Forest and Lassen Peak National Monument have given the name *Lassen Peak* a status of high rank in the geologic annals of the Cascade Range. The area has recently been set apart as the Lassen Volcanic National Park.

The name Lassen Peak, according to the United States Geological Survey, *is the only authorized form* on maps, reports, and gazetteers, from the Whitney Geological Survey of California in 1865, to the Geomorphic map of California and Nevada published by the Earthquake Investigation Commission, as well as on the latest map issued by the Forest Service.

Peter Lassen, the sturdy pioneer who guided many an early settler to the sunny lands of the Sacramento, lies buried in a lonely grave in Lassen County. A small, crumbling monument 30 miles from the peak marks his final resting place, but his greater and more enduring monuments are the county and peak named in his honor by a grateful people. The snow-capped Lassen Peak has piloted many an immigrant to the mountain pass.

In the early days of the Pacific Railroad surveys some pious monk called the peak St. Joseph's Mountain, but the names Lassen's Peak and Lassen's Butte soon came into general use. Whitney has shown the inappropriateness of the French term butte, which, translated exactly, means knoll. As Lassen never owned the mountain, in later years the possessive form of the name was dropped, and to correct an illicit tendency to wander from well-established usage the United States Geographic Board, in its decision of October 9, 1915, officially recognized the fact that the name of the mountain was *Lassen Peak*, not Mount Lassen.

AN ERUPTION OF LASSEN PEAK.

By ANDREW H. PALMER, Observer.

[Dated: Weather Bureau, San Francisco, Cal., July 14, 1916.]

Lassen Peak, the only active volcano within the United States, is located in the northeastern part of California, latitude 40° 30′ N., longitude 121° 30′ W., at a distance of 210 miles north-northeast of San Francisco. Rising 10,437 feet above sealevel, it is a conspicuous feature of the landscape. It is the southernmost peak of the Cascade Range, and like most of the mountains forming that range, it is of volcanic origin. While some geographers consider it a part of the Sierra Nevada, its origin and structure, as well as its position, justify its inclusion with the Cascades. These peaks have all been active volcanoes recently, geologically speaking, though measured in terms of years they have long been dormant.[1] Judging from the erosion on the sides of its old cone, Prof. R. S. Holway, of the University of California, believes that Lassen Peak had been quiet for a thousand years preceding its present period of activity. However, Cinder Cone, 10 miles to the northeast, and the Chaos Crags, at the northwest base of Lassen, have been in eruption as recently as 200 years ago.

On May 30, 1914, residents in the vicinity of the Peak were astonished by the appearance of smoke and steam rising from its summit. An investigation made the following day by a ranger in the United States Forest Service revealed the fact that a new crater, 25 by 40 feet, had been formed within the old crater, and that the products of the eruption, consisting of dust and bits of rock, were scattered upon the snow for a distance of 300 feet from the new vent. More eruptions followed, their violence increasing and the size of the crater growing with each successive outburst. The activity culminated with the two great eruptions of May 19 and 22, 1915. While eruptions have continued sporadically ever since, the climax of the present period of activity seems to have been passed. Outbursts continue to become fewer and less violent, much to the disappointment of scientific observers, but greatly to the satisfaction of the residents of the region. A total of about 225 eruptions have been observed. The eruptions during 1916, to July 15, appear to verify the prediction made at the beginning of the year by J. S. Diller, of the United States Geological Survey, that as an active volcano Lassen Peak is again on the decline. Figures 1–5, inclusive, are photographs taken at 10-minute intervals by Mr. Chester Mullen, at a distance of 5 miles from the summit. They show various stages in a typical eruption, that of October 6, 1915.

Certain phases of the present period of Lassen Peak's activity have been investigated and described by authorities in their respective branches. The geological and the physiographical aspects have naturally received the most attention. The physics and the chemistry of these eruptions have been investigated by representatives of the Carnegie Institution of Washington, but their report has not yet been made public. The meteorological and the seismological aspects have apparently been neglected, though many incidental references have been made to them. Certain facts have been observed which are at least of interest, if not of importance, in these two fields. As already indicated, opportunities of this kind are infrequent in the United States, compared with the average life of man, and it is quite probable that another such opportunity will not occur during the present generation. Feeling that certain considerations are worthy of record, the following observations have been collected from all available sources.

METEOROLOGICAL CONSIDERATIONS.

The meteorological aspects of a volcanic eruption are necessarily external to the crater, and are involved principally with the matter emitted. In the case of Lassen Peak certain common forms of matter are known to have been present. The dust and ash consisted entirely of rock fragments, pulverized as by great pressure, and showed no evidence of combustion such as might produce residual cinders. These fragments varied in size from microscopic bits to a mass 15 feet in diameter and weighing more than 60 tons. It appears that steam at high temperature accompanied most of the observed eruptions, and this on condensing formed the visible water vapor which when soiled by the dust particles gave the appearance of smoke. On mixing with the surrounding air this mass cooled, part of the water being precipitated as rain. Following the first eruption, that on May 30, 1914, icicles formed on the projecting rocks on the inner side of the crater. While Diller believes that a considerable volume of water in the form of steam was ejected, the phenomenon was in no sense a geyser, and there is no evidence of surface erosion due to excessive precipitation. Such rainfall must have been very local, perhaps

[1] For historical data relating to volcanic eruptions in the United States consult: *Whitney, J. D.* The United States. Boston, 1889. pp. 113–116.